UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NPRDC TR 85-19	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Navy Personnel Research and Development Center 6b OFFICE SYMBOL (*If applicable*) Code 62	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (*City, State, and ZIP Code*) San Diego, CA 92152-6800	7b. ADDRESS (*City, State, and ZIP Code*)
8a. NAME OF FUNDING/SPONSORING Office of the Assistant Secretary of Defense 8b. OFFICE SYMBOL (*If applicable*) (MRA&L)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (*City, State, and ZIP Code*) Department of Defense Washington, DC 20301-4000	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. OM,F PROJECT NO. WORK UNIT ACCESSION NO. MIPR-84-32-USAF

11. TITLE (*Include Security Classification*)
AN EMPIRICAL COMPARISON OF THE ACCURACY OF UNIVARIATE AND MULTIVARIATE CORRECTIONS FOR RANGE RESTRICTION

12. PERSONAL AUTHOR(S)
Booth-Kewley, Stephanie

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (*Year, Month, Day*)	15. PAGE COUNT
Technical Report	FROM 80 Oct TO 82 Oct	1985 February	57

16. SUPPLEMENTARY NOTATION

17. COSATI CODES		
FIELD	GROUP	SUB-GROUP
05	09	

18. SUBJECT TERMS (*Continue on reverse if necessary and identify by block number*)
Corrections for range restriction; test validity; validity coefficients; univariate selection; multivariate selection

19. ABSTRACT (*Continue on reverse if necessary and identify by block number*)

A study was conducted to determine whether uncorrected validity coefficients, those corrected for univariate range restriction, or those corrected for multivariate range restriction would be the most accurate in estimating the unrestricted population validity coefficients, and hence the most appropriate for use in Navy personnel selection research. Correlations were computed between scores on Armed Services Vocational Aptitude Battery (ASVAB) predictors--ASVAB tests and school selector composites--and student performance scores for seven Navy technical schools with numbers of students ranging from 880 to 2598. These correlations were regarded as "true" validity coefficients and each school was regarded as a population. Restricted samples were selected from each "population." Validity coefficients were computed for each restricted sample; these values were corrected using a univariate and multivariate correction procedure. Validity coefficients that were corrected using the multivariate procedure were generally more accurate than those corrected using the univariate procedure, and univariate corrected validity coefficients were more accurate than uncorrected validity coefficients.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL Nakada, Michael K.	22b. TELEPHONE (*Include Area Code*) (619) 225-2371 22c. OFFICE SYMBOL (Code 61)

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

NPRDC TR 85-19

FEBRUARY 1985

AN EMPIRICAL COMPARISON OF THE ACCURACY OF UNIVARIATE AND MULTIVARIATE CORRECTIONS FOR RANGE RESTRICTION

NAVY PERSONNEL RESEARCH
AND
DEVELOPMENT CENTER
San Diego, California 92152

NPRDC TR 85-19 February 1985

AN EMPIRICAL COMPARISON OF THE ACCURACY OF UNIVARIATE AND MULTIVARIATE CORRECTIONS FOR RANGE RESTRICTION

Stephanie Booth-Kewley

Reviewed by
James R. McBride

Approved by
Martin F. Wiskoff

Released by
J. E. Kohler
Commander, U.S. Navy
Commanding Officer

Navy Personnel Research and Development Center
San Diego, California 92152-6800

FOREWORD

This research was conducted within work unit MIPR-84-32-USAF, Armed Services Vocational Aptitude Battery (ASVAB-USAF), which was funded by the Office of the Assistant Secretary of Defense (MRA&L). Research in this series investigates the application of new technology to the ASVAB for establishing standards for selection and classification, for developing new tests forms, and for validating the battery against school and on-the-job performance measures.

This report is the second in a series conducted under this work unit. The first report (Swanson & Foley, 1982) described the development of a deliberate failure key for the Armed Forces Qualification Test (AFQT) composite of ASVAB. The objective of the present research was to determine whether ASVAB validity coefficients corrected for range restriction using a multivariate procedure would be more accurate than either those corrected using a univariate procedure or the uncorrected validity coefficients. Such a determination would improve the quality of ASVAB validity research, and thereby increase the effectiveness of personnel utilization in the armed forces.

J. E. KOHLER
Commander, U.S. Navy
Commanding Officer

J. W. TWEEDDALE
Technical Director

SUMMARY

Problem

The interpretation of validity coefficients based on data that are restricted due to selection is a frequent problem in personnel research; validity coefficients based on restricted samples generally underestimate the values that would be obtained in the whole population. Although the validity of the Armed Services Vocational Aptitude Battery (ASVAB) is a subject of continuing interest and investigation, whether validity coefficients should be corrected for range restriction using the univariate procedure or the multivariate procedure, or not corrected at all, has never been resolved.

Objectives

The objectives of this research were to determine (1) whether uncorrected, univariate corrected, or multivariate corrected ASVAB validity coefficients would be the most accurate in estimating unrestricted validity coefficients, and (2) which procedure would be most appropriate for use in Navy personnel selection research.

Approach

Predictor and criterion data were collected from seven Navy technical training schools. The number of students ranged from 880 to 2598.

For each of the seven schools, correlations of the predictor variables (10 ASVAB tests and the school selector composite) were computed with the criterion variable TIME (the number of days a student required to complete the course). These correlations were regarded as "true" validity coefficients and each school was regarded as a "population." Each population distribution was tested for linearity of regression and for homoscedasticity of variance.

Restricted samples were selected from each of the seven school populations using nine selection ratios, .10 through .90. Correlations between predictors and TIME were computed for each of the restricted samples. These correlations were then corrected using (1) univariate correction formulas, and (2) a multivariate correction formula. The Fisher's z transformation of each obtained correlation was subtracted from the z transformation of the true correlation, and the resulting error terms were compared.

Results and Conclusions

1. Correlations that were corrected for range restriction using the multivariate procedure were somewhat more accurate in estimating the population correlations than those corrected using the univariate procedure.

2. Univariate corrected correlations were more accurate than uncorrected correlations.

3. Both the univariate and the multivariate corrected correlations tended to overestimate the population values. This finding held up even when only the correlations that were based on distributions found to be linear, as well as those found to be both linear and homoscedastic, were considered. This suggests that the procedures used to test for linearity in this study were either inappropriate or, at the very least, not stringent enough.

4. The range restriction corrections were sensitive to departures from linearity, but were unaffected by departures from homoscedasticity.

5. Less than half of the population distributions used in this study met the conditions of both linearity and homoscedasticity. This result may be a function of the populations studied here, which were preselected school populations.

6. Although they were more accurate than the other two types of correlations, even the multivariate corrected correlations tended to overestimate the population value. This again may be in part because the populations in this study were preselected school populations rather than random applicant populations, and hence did not meet the assumptions of the correction formulas. For selection ratios of .70 or less, however, even though the assumptions of the multivariate correction were not met, the errors were small enough to be of no practical significance.

Recommendations

1. Further research should be conducted to (a) determine the range of conditions under which conventional correction formulas can be appropriately used, and (b) develop more effective methods for determining whether the distributions meet the assumptions underlying the correction procedures.

2. When the populations of interest have been preselected or fail to meet the assumptions of the correction formulas in other ways, researchers should be aware that even the multivariate correction procedure may yield poor estimates of the validity coefficients that would be obtained in the population of interest.

CONTENTS

LIST OF TABLES

INTRODUCTION

Background and Problem

The interpretation of validity coefficients based on data that are restricted due to selection is a frequent problem in personnel testing research. In general, the coefficient obtained for the restricted sample, on which selection from the population has occurred, underestimates the coefficient that would be obtained for an unrestricted, unselected population. But since criterion information is never available for the portion of the population not selected, validity information for the entire population is not available, either.

Pearson (1903) offered a solution to this problem by developing correction formulas that adjust validity coefficients for the effects of range restriction. These formulas apply to situations in which an experimenter wishes to estimate the unrestricted sample or population correlation between a criterion and an explicit selection variable--one on which direct selection has occurred--or between a criterion and an incidental selection variable--one on which indirect selection has occurred as the result of direct selection on a correlated variable. These correction formulas are based on the assumptions of linearity of regression and homoscedasticity of the error distributions (indicating that the conditional variance of a criterion score, given a predictor score, is constant for all predictor score values) in the population.

Although it can be shown algebraically that the correction formulas yield the exact population values if both assumptions are met, in reality the crucial population facts are never known. In addition, the Pearson correction formulas were devised for use in situations involving univariate selection--where the investigator wishes to obtain an estimate of the correlation between one predictor, on which selection has occurred, and a criterion. In many practical situations, however, multiple selectors may be involved. As pointed out by Linn (1968), even in cases involving only one stated selection variable, additional variables often exist that function as incidental selectors. Fortunately, a formula is available that corrects for range restriction when multivariate selection has occurred (Lawley, 1943).

In the Pearson (1903) univariate correction procedure, the specific computational formula that should be used depends on whether the predictor for which a population correlation coefficient is being estimated is an explicit or incidental selection variable. For explicit selection variables, the correction procedure uses the correlation between the predictor and the criterion in the sample, the standard deviation of the predictor in the sample, and the standard deviation of the predictor in the population. Use of the correction procedure for incidental selection variables requires the same information; also required is the correlation between the incidental selector and the criterion in the sample, and the correlation between the explicit and incidental selection variables in the sample.

The actual method of selection employed plays no part in Lawley's theorem, but the formula is based on the following assumptions: In the unselected group, the regression of each incidental selection variable on the set of explicit selection variables is linear, and, given the explicit selection variables, the conditional variance-covariance matrix of the incidental variables is independent of the values of the explicit selection variables. In addition, use of the multivariate correction procedure requires the following information: the means and standard deviations of all of the relevant selectors, whether explicit or incidental, in the sample and in the population of interest; the intercorrelations of all of these selectors in the sample and the population; and the correlations between each of the selectors and the criterion in the sample.

Selection and classification of Navy enlisted personnel are carried out using multiple predictors derived from the Armed Services Vocational Aptitude Battery (ASVAB), which consists of 10 cognitive tests. Selection for assignment to the various Navy technical schools is performed directly on the basis of ASVAB composites--certain combinations of ASVAB tests. Given the high intercorrelations that exist among the ASVAB tests, it seems probable that in addition to the tests that compose a given school selector composite, one or more of the other tests function as incidental selection variables. Thus, the Lawley (1943) multivariate correction formula may be more appropriate than the Pearson (1903) univariate formulas for estimating unrestricted validity coefficients in Navy personnel selection research.

Although the validity of the ASVAB is a subject of continuing interest and investigation, whether uncorrected, univariate corrected, or multivariate corrected validity coefficients should be used has never been resolved. In the past, Navy personnel researchers investigating the validity of the ASVAB have usually computed uncorrected or univariate corrected, rather than multivariate corrected, validity coefficients.

No consensus has appeared in the psychological literature regarding the appropriateness of using range restriction corrections and the conditions under which the univariate and multivariate corrections should be made. Furthermore, the research that has been conducted on range restriction corrections has focused primarily on univariate selection; little research has been published on the topic of multivariate corrections.

A number of studies (Lee, Miller, & Graham, 1982; Linn, Harnisch, & Dunbar, 1981; Rydberg, 1963; Srinivasan & Weinstein, 1973) have indicated that (univariate) corrected correlations are more accurate than uncorrected correlations; however, others (Greener & Osburn, 1979, 1980) have found this only to be true for moderate degrees of restriction (e.g., selection ratios of .60 or greater) or only for population correlations of a moderate to large size (e.g., greater than .40) (Greener & Osburn, 1979; Novick & Thayer, 1969). In addition, Lord and Novick (1968) identified a tendency for test score data to violate both assumptions of linearity and homoscedasticity at the extremes of the distribution; they expressed strong reservations about the accuracy of the corrections when the selected sample represents less than .70 of the unselected group. Similarly, Campbell (1976) concluded that the safest recourse is not to use the correction formulas. In contrast, Gross (1982) found that the correlation formulas can yield accurate results even for nonlinear, heteroscedastic relationships.

Objectives

The objectives of this research were to determine (1) whether uncorrected, univariate corrected, or multivariate corrected ASVAB validity coefficients would be the most accurate in estimating unrestricted validity coefficients, and (2) which procedure would be most appropriate for use in Navy personnel selection research.

APPROACH

Variables

The predictor variables were derived from ASVAB Forms 8, 9, and 10. They consisted of the 10 ASVAB tests comprising these forms, which are shown in Table 1, and the ASVAB selector composites used to determine eligibility for the schools in the study,

Table 1

Content of ASVAB 8, 9, 10 Tests

Predictor Variable	Abbreviation	Description
	ASVAB Tests[a]	
General Science	GS	A 25-item test of knowledge of the physical (13 items) and biological (12 items) sciences--11 minutes.
Arithmetic Reasoning	AR	A 30-item test of ability to solve arithmetic word problems--36 minutes.
Word Knowledge	WK	A 35-item test of knowledge of vocabulary, using words embedded in sentences (11 items) and synonyms (24 items)--11 minutes.
Paragraph Comprehension	PC	A 15-item test of reading comprehension--13 minutes.
Numerical Operations	NO	A 50-item speeded test of ability to add, subtract, multiply, and divide one- and two-digit numbers--3 minutes.
Coding Speed	CS	An 84-item speeded test of ability to recognize numbers associated with words from a table--7 minutes.
Auto and Shop Information	AS	A 25-item test of knowledge of automobiles, shop practices, and use of tools--11 minutes.
Mathematics Knowledge	MK	A 25-item test of knowledge of algebra, geometry, fractions, decimals, and exponents--24 minutes.
Mechanical Comprehension	MC	A 25-item test of knowledge of mechanical and physical principles--19 minutes.
Electronics Information	EI	A 20-item test of knowledge of electronics, radio, and electrical principles and information--9 minutes.

[a]Reported as Navy Standard Scores having a mean of about 50 and a standard deviation of 10 for an unrestricted recruit population.

which are shown in Table 2. A complete description of ASVAB 8, 9, and 10 is available elsewhere (Ree, Mullins, Mathews, & Massey, 1982).

Table 2

Schools Included in Study

Course Code	School or Course and Rating	School Type	N	Selector Composite
6230	Aviation Electronics Technician (AT)	BE/E	2245	MK+EI+GS=156+AR=218
6239	Aviation Electronics Technician, Avionics (AT)	A	1489	MK+EI+GS=156+AR=218
6403	Electronics Technician, Advanced Electronics Field (ET)	BE/E	958	MK+EI+GS=156+AR=218
6486	Boiler Technician (BT)	A	2085	MK+AS=94
6487	Engineman (EN)	BE/E	1258	MK+AS=94
6492	Machinist's Mate (MM)	BE/E	2356	MK+AS=94
6501	Aviation Machinist's Mate (AD)	BE/E	880	AR+MK+EI+GS=190

The criterion of school performance was contact time (TIME), the total number of hours required to complete the course. Negative correlations were expected for the TIME criterion because fewer hours were expected for the high-ability students. No other performance criteria were available for these schools, which use a self-paced mode of instruction.

Sample

Restricted samples were selected from each of the seven school populations using nine different selection ratios: .10, .20, .30, .40, .50, .60, .70, .80, and .90. These samples were extracted with selection being performed directly on the selector composite used by each school. The technical schools, sizes, selection composites, and cutting scores are presented in Table 2.

Analysis

For each of the seven schools, Pearson product-moment correlations of the 10 ASVAB tests and the school selector composite were computed with the TIME criterion, resulting in a total of 77 correlations (11 predictors and 7 schools). For this research, these were regarded as "true" validity coefficients and each school was regarded as a "population." In reality, population validity coefficients are not shown.

The population distribution of each ASVAB predictor against the criterion variable was tested to determine whether the conditions required by the univariate correction formula, linearity and homoscedasticity, were met. Linearity was tested using the F-test

for linearity of regression; homoscedasticity was tested using Bartlett's Box F-test for homogeneity of variance. It was not possible to determine whether the conditions required by the multivariate correction procedures were met, because no appropriate tests have been devised.

Correlations between the predictors and the criterion were computed for each of the curtailed samples within each school, resulting in a total of 693 correlations. These correlations were then corrected using (1) the Pearson (1903) univariate correction formulas for direct or indirect range restriction, as appropriate, and (2) the Lawley (1943) multivariate correction formula. In the application of the Lawley procedure, all of the predictors were treated as explicit selection variables. The actual multivariate corrections were made through a computer program (Sympson & Hartman, in progress) that used means, standard deviations, and ASVAB test intercorrelations for the samples and the populations and used sample-based validity coefficients as input. It was not necessary to provide the program with the latter information for the ASVAB composites because the program can accurately calculate composite statistics on the basis of the ASVAB test information.

The uncorrected, univariate corrected, and multivariate corrected validity coefficients were compared to the true validity coefficients. To obtain a measure of accuracy, the Fisher's z transformation of each uncorrected and each corrected correlation was subtracted from the z transformation of the true correlation, and the resulting error terms for the various types of correlations were compared. Medians of the z-error terms were computed for (1) each selection ratio, predictor, and school, (2) each school and predictor, collapsed across selection ratios, (3) each selection ratio and predictor, collapsed across schools, and (4) each selection ratio and school, collapsed across predictors. Medians of the z-error terms were also computed separately for distributions that were linear, nonlinear, homoscedastic, heteroscedastic, both linear and homoscedastic, and both nonlinear and heteroscedastic. The percentages of correlations with error terms of .05 or less were computed by selection ratio and by population correlation size.

Because both explicit and incidental selection can affect not only the absolute, but also the relative size of validity coefficients (Thorndike, 1949), the relative sizes of the uncorrected, univariate, and multivariate corrected correlations were compared. Specifically, the extent to which the five predictors with the highest population correlations overlapped the five predictors with the highest uncorrected, univariate corrected, and multivariate corrected correlations was examined.

RESULTS

Characteristics of the Population Distributions

Table 3 presents the results of the F-tests for linearity and homoscedasticity performed on the 77 distributions. Statistically significant results of the linearity and homoscedasticity tests ($p < .05$) presumably indicated nonlinearity and heteroscedasticity respectively.

As shown in Table 3, at the .05 significance level, 34 of the 77 distributions met both the linearity and the homoscedasticity assumptions. Twenty-five distributions met the linearity but not the homoscedasticity assumption, six distributions met the homoscedasticity but not the linearity assumption, and twelve distributions failed to meet either assumption.

Table 3

Results of the F-tests for Linearity and Homoscedasticity

School/ Population Distribution	Significance of Deviation	
	From Linearity	From Homoscedasticity
6230		
GS	.01	NS
AR	.01	.01
WK	.05	.05
PC	NS	NS
NO	NS	.01
CS	NS	.01
AS	NS	.05
MK	.05	.01
MC	.01	NS
EI	.01	NS
AR+MK+EI+GS	.01	.01
6239		
GS	NS	NS
AR	NS	NS
WK	.01	.01
PC	NS	NS
NO	NS	NS
CS	NS	NS
AS	NS	NS
MK	NS	NS
MC	.05	.05
EI	NS	NS
AR+MK+EI+GS	NS	NS
6403		
GS	.01	.05
AR	.05	NS
WK	NS	NS
PC	.05	NS
NO	.01	.05
CS	.05	.05
AS	NS	.05
MK	NS	.05
MC	NS	.05
EI	NS	NS
AR+MK+EI+GS	NS	NS
6486		
GS	NS	NS
AR	NS	NS
WK	NS	NS
PC	.01	.01
NO	NS	NS
CS	NS	NS
AS	.01	.01
MK	NS	NS
MC	NS	NS
EI	NS	NS
MK+AS	NS	.01

Table 3 (Continued)

School/ Population Distribution	Significance of Deviation	
	From Linearity	From Homoscedasticity
6487		
GS	NS	NS
AR	NS	NS
WK	NS	NS
PC	NS	NS
NO	NS	.05
CS	NS	NS
AS	NS	NS
MK	NS	NS
MC	NS	.05
EI	NS	NS
MK+AS	NS	.05
6492		
GS	NS	.01
AR	NS	.01
WK	NS	.05
PC	.01	NS
NO	NS	NS
CS	NS	.01
AS	NS	.01
MK	NS	.05
MC	NS	.05
EI	NS	.01
MK+AS	NS	.01
6501		
GS	NS	NS
AR	NS	NS
WK	NS	.01
PC	NS	NS
NO	NS	.01
CS	NS	.01
AS	NS	.01
MK	.01	.05
MC	NS	NS
EI	NS	.01
AR+MK+EI+GS	NS	.05

Accuracy of Correlations

For each of the seven schools in the study, Appendix A shows the uncorrected, univariate corrected, multivariate corrected, and "true" validity coefficients for nine selection ratios, and the sample size for each selection ratio. Appendix B shows the error terms, obtained by subtracting the Fisher's z transformation of each uncorrected or corrected validity coefficient from the z transformation of the corresponding population validity coefficient, as well as the medians of the correlation error terms for each school and predictor, collapsed across selection ratios. Since all of the true correlations were negative (which was expected, because the criterion measure was time), negative error terms indicated underestimation and positive error terms indicated overestimation. Table 4 presents the medians of the error terms, as well as overall median error terms, for each predictor and each selection ratio collapsed across schools. Table 5 presents the same information, but collapsed across predictors.

In general, the uncorrected correlations tended to underestimate the true correlations, whereas both the univariate and the multivariate corrected correlations tended to overestimate the true correlations. As expected, the degree of accuracy with which the true validity coefficients were estimated decreased as the selection ratio decreased.

By Selection Ratio

Table 4 indicates a slight tendency for the multivariate corrected correlations to yield the most accurate estimate of the population correlations. An inspection of the bottom of Table 4 reveals that for each of the nine selection ratios, neither the uncorrected nor the univariate corrected correlations had smaller overall median error terms than the multivariate corrected correlations. For selection ratios .20, .40, .50, and .60, smaller overall median errors were found for the multivariate corrected correlations than for the other two types of correlations. For the .10 selection ratio, the overall median error of the uncorrected correlations was equal to that obtained for the multivariate corrected correlations, although of the opposite sign, and smaller than that obtained for the univariate corrected correlations. For the .30, .70, .80, and .90 selection ratios, the overall median errors for the univariate corrected correlations were equal to those found for the multivariate corrected correlations, and smaller than those found for the uncorrected correlations.

It is also apparent from Table 4 that the absolute accuracy of the multivariate corrected validity coefficients varied substantially by selection ratio, with the overall median error terms ranging from .10 for the .10 selection ratio to .01 for the .90 ratio. The multivariate corrected correlations were somewhat more accurate than the univariate corrected correlations, which were more accurate than the uncorrected correlations.

By Predictor Variable

The overall median errors associated with the multivariate corrected correlations were lower than or equal to those associated with the uncorrected or the univariate corrected correlations for 9 of the 11 ASVAB predictors (see Table 4). For four of these nine predictors, the multivariate corrected correlations had smaller overall median errors than those obtained for the other two types of correlations; for four of these predictors the overall median errors of the multivariate and the univariate corrected correlations were the same, and for one of these predictors the overall median errors of the

Table 4

Median Fisher's Z-Error Terms for Each Selection Ratio and Predictor Collapsed Across Schools

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	-.10	-.09	-.07	-.11	-.10	-.06	-.04	-.03	-.02	-.06
Univ. Corrected	.08	.07	.04	.04	-.04	.04	.03	.04	.03	.04
Mul. Corrected	.15	.07	.04	.04	.03	.02	.02	.02	.01	.03
AR										
Uncorrected	-.10	-.11	-.10	-.10	-.08	-.06	-.05	-.04	-.03	-.08
Univ. Corrected	.09	-.06	-.03	-.02	.03	.02	.02	.02	.01	.02
Mul. Corrected	.25	.05	-.03	.02	.02	.03	.02	.02	.01	.02
WK										
Uncorrected	-.08	-.06	-.10	-.10	-.09	-.05	-.03	-.02	-.02	-.05
Univ. Corrected	.08	.11	-.07	.06	.07	.05	.03	.02	.01	.05
Mul. Corrected	-.11	-.05	.05	.05	.05	.04	0.1	.02	.02	.04
PC										
Uncorrected	-.10	-.06	-.08	-.09	-.08	-.04	-.04	-.03	-.02	-.05
Univ. Corrected	-.08	.10	-.05	-.03	-.03	.03	-.02	.01	.01	.03
Mul. Corrected	.12	.08	.05	.03	.04	.03	.02	.02	.01	.03
NO										
Uncorrected	-.03	-.04	-.04	-.04	-.03	-.02	-.02	-.01	.00	-.02
Univ. Corrected	.17	.03	-.04	.03	.01	-.01	-.01	.00	.01	.03
Mul. Corrected	.06	-.03	.04	-.03	.03	-.01	-.02	.01	.01	.02
CS										
Uncorrected	.07	-.04	-.04	-.04	.04	.04	-.02	.01	-.01	.03
Univ. Corrected	.19	.09	.06	.04	.05	.04	.03	.02	.01	.04
Mul. Corrected	.04	.02	.02	.01	.03	.02	.02	.01	.00	.02
AS										
Uncorrected	-.10	-.13	-.11	-.07	-.07	-.09	-.07	-.05	-.04	-.07
Univ. Corrected	.18	.08	-.03	.06	-.03	.02	-.01	.01	.01	.03
Mul. Corrected	.08	.06	.06	.04	.03	.05	.02	.04	.02	.04
MK										
Uncorrected	-.10	-.15	-.12	-.10	-.07	-.06	-.05	-.04	-.02	-.07
Univ. Corrected	.18	-.07	.03	.06	.05	.04	.02	.02	.02	.05
Mul. Corrected	.19	.05	-.04	.03	-.04	-.03	.01	.02	.01	.03
MC										
Uncorrected	-.15	-.07	-.09	-.09	-.06	-.06	-.05	-.04	-.02	-.06
Univ. Corrected	.19	.06	.07	.05	.04	.04	.03	.02	.01	.04
Mul. Corrected	.07	.07	.07	.04	.03	.04	.03	.03	.02	.04
EI										
Uncorrected	-.05	-.09	-.09	-.07	-.05	-.05	-.04	-.03	-.02	-.05
Univ. Corrected	.18	.12	.08	.05	.03	.02	.03	.02	.02	.03
Mul. Corrected	.19	.08	.09	.05	.03	.03	.04	.03	.02	.04
Composite										
Uncorrected	-.15	-.15	-.10	-.10	-.09	-.08	-.05	-.03	-.02	-.08
Univ. Corrected	.23	.14	.13	.05	.04	.03	.02	.02	.02	.05
Mul. Corrected	.18	.09	.08	.04	.05	.04	.03	.05	.03	.05
Overall Median										
Uncorrected	-.10	-.09	-.09	-.08	-.07	-.06	-.04	-.03	-.02	
Univ. Corrected	.18	.08	.05	.05	.04	.04	.02	.02	.01	
Mul. Corrected	.10	.06	.05	.04	.03	.03	.02	.02	.01	

Table 5

Median Fisher's Z-Error Terms for Each Selection Ratio and School Collapsed Across Predictors

School	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
6230										
Uncorrected	-.13	-.14	-.14	-.14	-.11	-.11	-.08	-.06	-.04	-.10
Univ. Corrected	.56	.34	.17	.13	.12	.08	.05	.02	.02	.10
Mul. Corrected	.19	.19	.17	.11	.10	.06	.05	.05	.03	.07
6239										
Uncorrected	-.04	-.08	-.05	-.07	-.07	-.05	-.06	-.03	-.02	-.05
Univ. Corrected	.51	.26	.11	.06	-.01	.02	.00	.01	.01	.03
Mul. Corrected	.24	.19	.09	.06	.02	.02	.02	.03	.02	.04
6403										
Uncorrected	-.03	-.07	-.03	-.04	-.07	-.02	-.03	-.02	-.01	-.03
Univ. Corrected	.29	.09	.15	.06	.05	.04	.02	.02	.01	.04
Mul. Corrected	.10	.07	.06	.03	.02	.02	.02	.02	.01	.02
6486										
Uncorrected	-.15	-.15	-.10	-.12	-.09	-.05	-.02	-.03	-.02	-.06
Univ. Corrected	.12	-.04	.06	-.03	-.03	.05	.05	.03	.02	.04
Mul. Corrected	.06	-.04	.04	.04	.03	.05	.06	.03	.02	.04
6487										
Uncorrected	-.05	-.09	-.07	-.05	-.05	-.05	-.05	-.03	-.02	-.05
Univ. Corrected	-.05	-.06	.03	.02	.03	.02	-.01	.01	.01	.02
Mul. Corrected	.14	.02	.02	.03	.04	.03	.01	.01	.02	.03
6492										
Uncorrected	-.08	-.05	-.05	-.05	-.04	-.03	-.04	-.02	-.02	-.04
Univ. Corrected	.08	.07	.03	.04	.04	.04	.02	.02	.02	.03
Mul. Corrected	.06	.08	-.05	.04	.03	.03	.01	.01	.01	.03
6501										
Uncorrected	-.13	-.15	-.11	-.10	-.08	-.06	-.04	-.01	-.02	-.06
Univ. Corrected	-.05	-.05	.05	-.03	-.03	.01	.01	.01	.01	.02
Mul. Corrected	.08	.04	.05	.02	.02	.01	.01	.02	.01	.02
Overall Median										
Uncorrected	-.10	-.09	-.09	-.08	-.07	-.06	-.04	-.03	-.02	
Univ. Corrected	.18	.08	.05	.05	.04	.04	.02	.02	.01	
Mul. Corrected	.10	.06	.05	.04	.03	.03	.02	.02	.01	

multivariate corrected and the uncorrected correlations were the same. In addition, the overall median error terms associated with the multivariate corrected validity coefficients did not vary substantially by predictor, ranging only from .02 to .05.

By School

Table 5 indicates that for five of the seven schools used in the study, the overall median errors obtained for the multivariate corrected correlations were lower than or equal to those obtained for the other two types of correlations. For two of these five predictors the multivariate corrected correlations had smaller overall median errors than the uncorrected or univariate corrected correlations; for the other three predictors the overall median errors obtained for multivariate and univariate corrected correlations were the same. The overall median errors associated with the multivariate corrected correlations varied to a moderate extent across schools, ranging from .02 to .07.

By Distribution Characteristics

Table 6 shows the median error terms of correlations based on population distributions that are linear, nonlinear, homoscedastic, heteroscedastic, both linear and homoscedastic, and both nonlinear and heteroscedastic. As indicated, there was a slight tendency for the correlations based on the linear distributions to have smaller z-error terms than those based on nonlinear distributions. This tendency was found for all three types of correlation coefficients.

Table 6

Median Fisher's Z-Error Terms for Distributions with Different Characteristics

Distribution Characteristics	Uncorrected	Univariate Corrected	Multivariate Corrected
Linear	-.05	.03	.03
Nonlinear	-.08	.06	.05
Homoscedastic	-.06	.04	.03
Heteroscedastic	-.06	.04	.03
Linear and homoscedastic	-.05	.03	.02
Nonlinear and heteroscedastic	-.06	.04	.04

Surprisingly, the correlations based on the homoscedastic distributions did not have smaller error terms than those based on heteroscedastic distributions; in fact, the median error terms were identical (see Table 6). Nor did the correlations based on distributions that were both linear and homoscedastic have smaller error terms that those based on all distributions found to be linear.

Percentages of Correlations With Acceptable Amounts of Error

Although these results indicate that the multivariate corrected correlations were generally somewhat more accurate than the other two types of correlations, the amount of error incurred by the multivariate correction procedure was often substantial: The obtained error terms were .08 or greater for over 20 percent of the multivariate corrected correlations. Of course, even more error was associated with the uncorrected and univariate corrected correlations.

If correlations with error terms of .05 or less are considered to be acceptable estimates of the population values, then the results of this study may be analyzed in terms of the percentages of uncorrected, univariate, and multivariate corrected correlations that had acceptable amounts of error. These percentages are presented by selection ratio in Table 7 and by population correlation size in Table 8.

Table 7

Percentages of Correlations with Fisher's Z-Error Terms of .05 or Less by Selection Ratio

Correlation	Selection Ratio								
	.10 (%)	.20 (%)	.30 (%)	.40 (%)	.50 (%)	.60 (%)	.70 (%)	.80 (%)	.90 (%)
Uncorrected	36	25	36	35	42	48	68	87	99
Univ. Corrected	17	29	51	58	65	75	83	94	99
Mul. Corrected	25	49	56	75	82	83	87	97	97

Table 8

Percentages of Correlations with Fisher's Z-Error Terms of .05 or Less by Population Correlation Size

Correlation	Population Correlation Size				
	<.15 (%)	.15-.19 (%)	.20-.24 (%)	.25-.29 (%)	>.30 (%)
Uncorrected	69	64	56	33	29
Univ. Corrected	66	64	69	73	36
Mul. Corrected	71	72	78	84	50

Table 7 indicates that, as expected, the percentages of the correlations with error terms of .05 or less generally decreased as the selection ratio decreased. In addition, it was found that for all but the .10 and .90 selection ratios, the percentages of the multivariate corrected correlations with z-error terms of .05 or less were larger than for the other two types of correlations, and the percentages of the univariate corrected correlations were error terms of .05 or less were larger than for the uncorrected correlations. This result, again, suggests that the multivariate corrected correlations were more accurate than the univariate corrected correlations, which were more accurate than the uncorrected correlations.

If it were decided that correlations with error terms of .05 or less must be obtained in at least 90 percent of the cases to be acceptable, then based on Table 7, it appears that the multivariate corrected correlations would have to be computed on samples representing selection ratios of .73 or greater to yield acceptable results. If, on the other hand, the uncorrected or univariate corrected correlations were used as indices of validity, then the correlations would have to be based on selection ratios of .77 or greater and .79 or greater respectively. (These values were determined by interpolation of the values presented in Table 7.)

Table 8 shows the percentages of correlations with error terms of .05 or less for population correlations of various sizes. As indicated, for all population values shown, these percentages were higher for the multivariate corrected correlations than for univariate corrected correlations. For all but the .15 through .19 range of population correlation sizes, the percentages were higher for the univariate corrected correlations than for the uncorrected correlations. For the uncorrected, but not the corrected correlations, the percentages decreased as the population correlations increased. While no clear relationship between the size of the population correlations and the accuracy of the (univariate and multivariate) corrected correlations was observed, this may have been because all of the population correlations in this study were fairly small, ranging from -.07 to -.50, with 90 percent falling between -.10 and -.35.

Relative Accuracy of Correlations

In order to evaluate how the relative sizes of the uncorrected, univariate corrected, and multivariate corrected correlations compared with those of the population correlations, the five predictors with the largest correlations were selected and compared (without regard to the order of the five in terms of size) with the five predictors having the largest population correlations. This was done for each type of correlation and for each of the seven schools. The number of curtailed samples (selection ratios), out of a possible nine, for which these five predictors were the same are shown in Table 9. Also shown are the overall percentages, collapsed across schools, of the curtailed samples for which the predictors were the same.

As Table 9 indicates, there was a tendency for the multivariate corrected correlations to be more accurate in terms of relative size than the uncorrected or univariate corrected correlations. Specifically, the five predictors with the highest population correlations were precisely the same as the five with the highest multivariate corrected correlations for 52 percent of the curtailed samples; the corresponding percentages for the uncorrected and univariate corrected correlations were 25 and 32 percent respectively. These results suggest that the relative size of the validity coefficients was substantially affected by selection, and also that the multivariate, and to a lesser extent the univariate correction procedure, improved the accuracy of these correlations.

Table 9

Curtailed Samples for Which the Five Predictors With the Highest Obtained Correlations Were the Same as the Five With the Highest Population Correlations

School	Uncorrected		Univariate Corrected		Multivariate Corrected	
	N	%	N	%	N	%
6230	2	22	6	67	9	100
6239	3	33	4	44	4	44
6403	3	33	0	0	3	33
6486	1	11	4	44	4	44
6487	3	33	3	33	6	67
6492	1	11	0	0	1	11
6501	3	33	3	33	6	67
All schools	16	25	20	32	33	52

DISCUSSION

Overall, the results of this study indicated that the multivariate corrected correlations yield slightly more accurate estimates of the "true" validity coefficients than the univariate corrected correlations, and that the univariate corrected correlations are more accurate than the uncorrected correlations. Given the nature of the multivariate correction procedure (Lawley, 1943), the finding that it was more accurate than the univariate correction procedure does not seem surprising. In producing estimates of the unrestricted correlations, the multivariate correction procedure is capable of taking a greater amount of information into consideration than the univariate procedure.

The finding that univariate corrected correlations tended to be more accurate than the uncorrected correlations was expected; the same results have been obtained by Lee et al. (1982), Linn et al. (1981), Rydberg (1963), and Srinivasan and Weinstein (1973). However, while Greener and Osburn (1979, 1980) obtained this finding for moderate degrees of range restriction only (e.g., selection ratios of .60 or greater), in the present study the univariate corrected correlations tended to be more accurate than the uncorrected correlations for all selection ratios, except for .10.

The uncorrected correlations generally underestimated the population validity coefficients, whereas both the univariate and multivariate corrected correlations generally overestimated the true values. The tendency for the corrected correlations to overestimate the true values has been found in other studies (Greener & Osburn, 1979, 1980; Lee, 1982; Novick & Thayer, 1969). It is presumably due to nonlinearity in the population distributions in the form of a flattening of the regression slope, which did characterize many of the unrestricted distributions in this study. However, the corrected correlations that were based on those distributions found to be linear, as well as those based on

distributions found to be both linear and homoscedastic, still tended to overestimate the true correlations, albeit to a lesser extent than the correlations based on nonlinear distributions. These results suggest that the methods used to test for linearity in this investigation were either inappropriate, or at the very least, not sufficiently stringent for the purposes of the correction formulas.

Another interesting finding with regard to the characteristics of the population distributions was that while the accuracy of the corrections appeared to be reduced somewhat by deviations from linearity, accuracy was not apparently affected by deviations from homoscedasticity. These results suggest that, as was found by Greener and Osburn (1979) and by Novick and Thayer (1969), the correction formulas are sensitive to departures from linearity but are relatively unaffected by departures from homoscedasticity.

The finding of this study, that less than half of the unrestricted distributions met both the linearity and homoscedasticity assumptions, supports Lord and Novick's (1968) contention that there is a tendency for distributions involving test score data to violate these assumptions. As noted above, however, there is evidence that moderate departures from homoscedasticity do not reduce the accuracy of the corrections. Also, in this particular study, it was not clear whether the deviations from these conditions were due to sampling error--since the "populations" that were used were actually just very large samples, rather than true populations--or to actual characteristics of the unrestricted Navy population. Further research will be needed to make this determination.

That the "populations" used in the present study were actually Navy school samples is, in fact, the major limitation of this study, but one not easily circumvented using real data. Criterion, and hence, criterion-related validity data would never be available for an unselected Navy population. It is likely that the Navy school samples used differed considerably from an unselected Navy population in that the school samples were much more restricted in ability than a Navy population would be. Students are required to meet a variety of selection criteria before attending a Navy school. To the extent that the school samples that served as populations differed from the real population of interest, the present results may not generalize to typical Navy validation settings. A related limitation is the fact that for all distributions used, the population correlations tended to be small (90% were between -.10 and -.35). Whether or not the results of this study would be replicated in situations involving a wider range of population correlations remains to be determined.

While the present results showed that multivariate corrected correlations were generally more accurate than the other two types of correlations, the amount of overestimation incurred by the multivariate correction procedure was, nevertheless, often substantial. The error terms were .08 or greater in over one fifth of the cases, which would typically correspond to .07 or .08 correlation points. This amount of error may be deemed unacceptable for many research purposes; yet, the alternative of using the uncorrected or univariate corrected validity coefficients would involve even greater amounts of error, and thus be even more unacceptable.

Since the current findings show that reasonably small error terms, of .05 or less, can generally be expected (in about 87 percent of the cases when the multivariate correction procedure is used) when the selection ratio is .70 or greater, it appears that samples representing smaller selection ratios should probably not be used for most purposes, unless substantial amounts of error can be tolerated. If, on the other hand, the population correlations must be estimated with a very high degree of precision (e.g., error terms no

larger than .03), it is doubtful that any of the correction formulas will be adequate, even if large selection ratios are used.

CONCLUSIONS

1. Correlations that are corrected for range restriction using the multivariate procedure (Lawley, 1943) were somewhat more accurate in estimating the population correlations than those corrected using the univariate procedure (Pearson, 1903).

2. Univariate corrected correlations were more accurate than uncorrected correlations.

3. Both the univariate and the multivariate corrected correlations tended to overestimate the population values, and this finding held up even when only the correlations that were based on distributions found to be linear, as well as those found to be both linear and homoscedastic, were considered. This suggests that the procedures used to test for linearity in this study were either inappropriate or, at the very least, not stringent enough.

4. The range restriction corrections were sensitive to departures from linearity but were relatively unaffected by departures from homoscedasticity.

5. Less than half of the population distributions used in this study met the conditions of both linearity and homoscedasticity. This result may be a function of the populations studied here, which were preselected school populations.

6. Although they were more accurate than the other two types of correlations, even the multivariate corrected correlations tended to overestimate the population value. This again may be in part because the populations in this study were preselected school populations rather than random applicant populations, and hence did not meet the assumptions of the correction formulas. For selection ratios of .70 or less, however, even though the assumptions of the multivariate correction were not met, the errors were small enough to be of no practical significance.

RECOMMENDATIONS

1. Further research should be conducted to (a) determine the range of conditions under which conventional correction formulas can be appropriately used, and (b) develop more effective methods for determining whether the distributions meet the assumptions underlying the correction procedures.

2. When the populations of interest have been preselected or fail to meet the assumptions of the correction formulas in other ways, researchers should be aware that even the multivariate correction procedure may yield poor estimates of the validity coefficients that would be obtained in the population of interest.

REFERENCES

Campbell, J. P. (1976). Psychometric theory. In M. Dunnette (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand-McNally.

Greener, J. M., & Osburn, H. G. (1979). An empirical study of the accuracy of corrections for restriction in range due to explicit selection. Applied Psychological Measurement, 3, 31-41.

Greener, J. M., & Osburn, H. G. (1980). Accuracy of corrections for restriction in range due to explicit selection in heteroscedastic and nonlinear distributions. Educational and Psychological Measurement, 40, 337-346.

Gross, A. L. (1982). Relaxing the assumptions underlying corrections for restriction of range. Educational and Psychological Measurement, 42, 795-801.

Lawley, D. (1943-1944). A note on Karl Pearson's selection formulae. Royal Society of Edinburgh, Proceedings, Section A, 62, 28-30.

Lee, R., Miller, K. J., & Graham, W. K. (1982). Corrections for restriction of range and attenuation in criterion-related validation studies. Journal of Applied Psychology, 67, 637-639.

Linn, R. L. (1968). Range restriction problems in the use of self-selected groups for test validation. Psychological Bulletin, 69, 69-73.

Linn, R. L., Harnisch, D. L., & Dunbar, S. B. (1981). Corrections for range restriction: An empirical investigation of conditions resulting in conservation corrections. Journal of Applied Psychology, 66, 655-663.

Lord, F. M., & Novick, M. R. (1968). Statistical theories of mental test scores. Reading, MA: Addison-Wesley.

Novick, M. R., Thayer, D. T. (1969). An investigation of the accuracy of the Pearson selection formulas (Research Memorandum 69-22). Princeton, NJ: Educational Testing Service.

Pearson, K. (1903). On the influence of natural selection on the variability and correlations of organs. Philosophical transactions of the Royal Society, London, Series A, 200, 1-66.

Ree, R., Mullins, C., Mathews, J., & Massey, R. (March 1982). Armed Services Vocational Aptitude Battery: Item and factor analyses of forms 8, 9, and 10 (AFHRL TR 81-55). Brooks Air Force Base, TX: Air Force Human Resources Laboratory.

Rydberg, S. (1963). Bias in prediction. Stockholm, Sweden: Almqvist & Wisksell.

Srinivasan, V., & Weinstein, A. G. (1973). Effects of curtailment on an admissions model for a graduate management program. Journal of Applied Psychology, 58, 339-346.

Sympson, J. B., & Hartman, L. (In progress). MULTICOR: A computer program for correcting means, standard deviations, and correlations for multivariate restriction in range (Computer program manual). San Diego: Navy Research and Development Center.

Swanson, L., & Foley, P. (1982). Development of Armed Forces Qualification Test (AFQT) deliberate failure keys for Armed Services Vocational Aptitude Battery (ASVAB) forms 8, 9, and 10 (NPRDC Spec. Rep. 83-4). San Diego: Navy Personnel Research and Development Center.

Thorndike, R. L. (1949). Personnel selection. New York: Wiley.

APPENDIX A

UNCORRECTED, UNIVARIATE CORRECTED, AND MULTIVARIATE CORRECTED CORRELATIONS

Table A-1

Uncorrected, Univariate Corrected, and Multivariate Corrected Correlations for Aviation Electronics Technician BE/E School (AT-6230)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
N =	212	452	654	918	1123	1325	1577	1782	2013	2245
GS										
Uncorrected	.05	.03	.00	-.03	-.04	-.05	-.09	-.12	-.14	-.19
Univ. Corrected	-.75	-.60	-.51	-.42	-.37	-.31	-.29	-.27	-.23	
Mul. Corrected	-.43	-.37	-.36	-.30	-.28	-.24	-.24	-.24	-.22	
AR										
Uncorrected	-.18	-.22	-.25	-.24	-.28	-.28	-.30	-.32	-.36	-.41
Univ. Corrected	-.76	-.65	-.62	-.54	-.53	-.48	-.45	-.43	-.43	
Mul. Corrected	-.69	-.66	-.61	-.52	-.52	-.47	-.45	-.45	-.45	
WK										
Uncorrected	-.05	-.06	-.02	-.02	-.05	-.06	-.07	-.08	-.12	-.17
Univ. Corrected	-.66	-.47	-.31	-.29	-.27	-.25	-.22	-.19	-.19	
Mul. Corrected	-.40	-.37	-.33	-.26	-.26	-.23	-.22	-.21	-.20	
PC										
Uncorrected	-.08	-.04	-.03	-.01	-.06	-.07	-.10	-.12	-.15	-.18
Univ. Corrected	-.45	-.36	-.25	-.26	-.25	-.23	-.21	-.20	-.20	
Mul. Corrected	-.32	-.30	-.28	-.21	-.22	-.20	-.20	-.21	-.20	
NO										
Uncorrected	-.18	-.09	-.14	-.15	-.16	-.17	-.19	-.20	-.21	-.23
Univ. Corrected	-.49	-.40	-.34	-.26	-.23	-.22	-.23	-.23	-.22	
Mul. Corrected	-.27	-.19	-.20	-.20	-.20	-.21	-.22	-.23	-.23	
CS										
Uncorrected	-.19	-.19	-.21	-.23	-.23	-.23	-.25	-.24	-.24	-.27
Univ. Corrected	-.53	-.49	-.39	-.32	-.29	-.27	-.27	-.26	-.26	
Mul. Corrected	-.28	-.25	-.25	-.27	-.27	-.28	-.29	-.28	-.27	
AS										
Uncorrected	-.05	-.08	-.11	-.15	-.15	-.13	-.16	-.16	-.18	-.22
Univ. Corrected	-.40	-.32	-.25	-.28	-.28	-.25	-.25	-.22	-.23	
Mul. Corrected	-.29	-.32	-.32	-.32	-.30	-.26	-.26	-.26	-.25	

Table A-1 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
MK										
Uncorrected	-.35	-.26	-.30	-.32	-.37	-.37	-.39	-.42	-.45	-.47
Univ. Corrected	-.87	-.70	-.68	-.61	-.60	-.55	-.53	-.52	-.51	
Mul. Corrected	-.79	-.66	-.61	-.55	-.56	-.53	-.51	-.51	-.51	
MC										
Uncorrected	-.17	-.21	-.24	-.23	-.26	-.23	-.26	-.27	-.28	-.32
Univ. Corrected	-.65	-.46	-.46	-.42	-.42	-.38	-.37	-.36	-.34	
Mul. Corrected	-.47	-.48	-.47	-.42	-.42	-.37	-.37	-.36	-.34	
EI										
Uncorrected	-.17	-.20	-.17	-.18	-.18	-.18	-.21	-.22	-.24	-.28
Univ. Corrected	-.81	-.66	-.56	-.48	-.42	-.37	-.36	-.33	-.31	
Mul. Corrected	-.45	-.45	-.43	-.39	-.38	-.35	-.34	-.33	-.32	
AR+MK+EI+GS										
Uncorrected	-.40	-.35	-.39	-.39	-.42	-.41	-.43	-.46	-.48	-.50
Univ. Corrected	-.90	-.77	-.74	-.66	-.65	-.59	-.57	-.56	-.55	
Mul. Corrected	-.87	-.78	-.73	-.65	-.64	-.59	-.57	-.57	-.55	

Table A-2

Uncorrected, Univariate Corrected, and Multivariate Corrected Correlations for Aviation Electronics Technician "A" School (AT-6239)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
N =	149	297	441	588	752	889	1061	1197	1341	1489
GS										
Uncorrected	-.03	-.06	-.02	.04	.03	.01	-.01	-.04	-.05	-.07
Univ. Corrected	-.64	-.46	-.26	-.15	-.12	-.11	-.10	-.11	-.10	
Mul. Corrected	-.37	-.33	-.21	-.11	-.09	-.09	-.09	-.11	-.10	
AR										
Uncorrected	-.10	-.11	-.14	-.15	-.11	-.11	-.14	-.16	-.19	-.21
Univ. Corrected	-.66	-.45	-.33	-.27	-.21	-.20	-.21	-.22	-.22	
Mul. Corrected	-.50	-.45	-.37	-.31	-.23	-.22	-.22	-.24	-.23	
WK										
Uncorrected	-.09	-.07	-.02	-.02	-.03	-.05	-.06	-.08	-.09	-.12
Univ. Corrected	-.56	-.36	-.17	-.13	-.11	-.13	-.12	-.13	-.12	
Mul. Corrected	-.39	-.30	-.20	-.14	-.13	-.14	-.13	-.14	-.13	
PC										
Uncorrected	.02	-.01	-.04	.00	-.01	-.03	-.02	-.04	-.06	-.09
Univ. Corrected	-.30	-.24	-.15	-.09	-.09	-.09	-.07	-.08	-.09	
Mul. Corrected	-.21	-.21	-.17	-.10	-.09	-.09	-.07	-.10	-.09	
NO										
Uncorrected	-.18	-.13	-.16	-.17	-.18	-.19	-.20	-.21	.21	-.21
Univ. Corrected	-.45	-.29	-.23	-.20	-.20	-.20	-.21	-.22	-.22	
Mul. Corrected	-.25	-.18	-.19	-.19	-.19	-.20	-.21	-.22	-.22	
CS										
Uncorrected	-.19	-.16	-.20	-.20	-.21	-.22	-.23	-.23	-.23	-.24
Univ. Corrected	-.50	-.34	-.26	-.23	-.23	-.23	-.25	-.24	-.24	
Mul. Corrected	-.28	-.22	-.23	-.23	-.24	-.25	-.26	-.25	-.24	
AS										
Uncorrected	-.04	-.03	-.09	-.09	-.10	-.12	-.10	-.11	-.12	-.14
Univ. Corrected	-.31	-.16	-.15	-.14	-.15	-.16	-.14	-.14	-.14	
Mul. Corrected	-.22	-.24	-.25	-.20	-.18	-.19	-.16	-.18	-.16	

Table A-2 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
MK										
Uncorrected	-.18	-.16	-.09	-.12	-.14	-.16	-.14	-.17	-.19	-.21
Univ. Corrected	-.72	-.51	-.31	-.27	-.25	-.25	-.21	-.23	-.23	
Mul. Corrected	-.62	-.47	-.29	-.26	-.25	-.25	-.22	-.24	-.23	
MC										
Uncorrected	-.13	-.15	-.18	-.18	-.16	-.16	-.13	-.15	-.15	-.17
Univ. Corrected	-.52	-.35	-.31	-.27	-.24	-.23	-.18	-.19	-.18	
Mul. Corrected	-.39	-.39	-.35	-.31	-.26	-.24	-.20	-.21	-.19	
EI										
Uncorrected	-.09	-.04	-.05	-.07	-.09	-.10	-.11	-.11	-.12	-.14
Univ. Corrected	-.66	-.41	-.26	-.20	-.19	-.18	-.17	-.17	-.15	
Mul. Corrected	-.35	-.27	-.22	-.20	-.19	-.18	-.18	-.18	-.16	
AR+MK+EI+GS										
Uncorrected	-.24	-.20	-.15	-.14	-.15	-.16	-.17	-.20	-.22	-.24
Univ. Corrected	-.75	-.55	-.36	-.29	-.26	-.26	-.24	-.26	-.25	
Mul. Corrected	-.68	-.56	-.40	-.33	-.28	-.28	-.26	-.28	-.27	

Table A-3

Uncorrected, Univariate Corrected and Multivariate Corrected Correlations for Electronics Technician BE/E School (ET-6403)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
N =	92	190	291	384	468	575	683	770	872	958
GS										
Uncorrected	-.12	-.05	-.09	-.08	-.05	-.06	-.09	-.09	-.12	-.12
Univ. Corrected	-.55	-.33	-.33	-.26	-.21	-.18	-.18	-.16	-.15	
Mul. Corrected	-.37	-.19	-.21	-.17	-.15	-.13	-.14	-.13	-.13	
AR										
Uncorrected	-.17	-.15	-.07	-.10	-.17	-.17	-.21	-.22	-.23	-.25
Univ. Corrected	-.57	-.33	-.22	-.23	-.28	-.25	-.27	-.27	-.26	
Mul. Corrected	-.47	-.39	-.25	-.24	-.29	-.26	-.27	-.27	-.26	
WK										
Uncorrected	.08	-.01	-.07	-.07	-.06	-.05	-.06	-.05	-.05	-.07
Univ. Corrected	-.29	-.18	-.22	-.19	-.17	-.13	-.12	-.09	-.07	
Mul. Corrected	-.03	-.10	-.13	-.11	-.09	-.08	-.08	-.06	-.05	
PC										
Uncorrected	-.08	-.09	-.01	.00	-.04	-.07	-.07	-.07	-.08	-.09
Univ. Corrected	-.27	-.15	-.09	-.08	-.11	-.13	-.11	-.10	-.09	
Mul. Corrected	-.26	-.21	-.12	-.06	-.11	-.12	-.11	-.11	-.10	
NO										
Uncorrected	-.10	-.13	-.09	-.09	-.13	-.11	-.11	-.12	.13	-.13
Univ. Corrected	-.33	-.11	-.09	-.10	-.14	-.12	-.12	-.13	-.13	
Mul. Corrected	-.07	-.17	-.09	-.10	-.13	-.11	-.11	-.11	-.12	
CS										
Uncorrected	-.22	-.23	-.20	-.22	-.24	-.23	-.23	-.21	-.20	-.20
Univ. Corrected	-.46	-.29	-.22	-.25	-.27	-.26	-.25	-.22	-.21	
Mul. Corrected	-.20	-.27	-.20	-.21	-.23	-.22	-.22	-.21	-.20	
AS										
Uncorrected	-.13	-.05	-.16	-.10	-.09	-.12	-.11	-.13	-.13	-.14
Univ. Corrected	-.41	-.22	-.31	-.20	-.16	-.16	-.14	-.16	-.15	
Mul. Corrected	-.22	-.09	-.22	-.13	-.14	-.16	-.16	-.16	-.15	

Table A-3 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
MK										
Uncorrected	-.23	-.14	-.16	-.19	-.24	-.21	-.24	-.27	-.30	-.32
Univ. Corrected	-.64	-.37	-.35	-.33	-.36	-.30	-.32	-.32	-.32	
Mul. Corrected	-.48	-.35	-.33	-.32	-.34	-.29	-.30	-.32	-.32	
MC										
Uncorrected	-.02	-.11	-.19	-.13	-.13	-.16	-.14	-.14	-.17	-.18
Univ. Corrected	-.36	-.26	-.34	-.25	-.22	-.22	-.19	-.18	-.19	
Mul. Corrected	-.22	-.02	-.27	-.19	-.20	-.22	-.20	-.19	-.19	
EI										
Uncorrected	-.07	-.09	-.17	-.13	-.12	-.15	-.16	-.16	-.17	-.17
Univ. Corrected	-.55	-.35	-.38	-.28	-.25	-.23	-.23	-.21	-.20	
Mul. Corrected	-.26	-.16	-.27	-.20	-.20	-.21	-.22	-.20	-.19	
AR+MK+EI+GS										
Uncorrected	-.34	-.24	-.29	-.27	-.30	-.29	-.33	-.34	-.36	-.36
Univ. Corrected	-.72	-.48	-.49	-.42	-.43	-.38	-.40	-.39	-.39	
Mul. Corrected	-.67	-.46	-.45	-.40	-.41	-.38	-.39	-.39	-.39	

Table A-4

Uncorrected, Univariate Corrected, and Multivariate Corrected Correlations for Boiler Technician "A" School (BT-6486)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
N =	217	394	656	822	1007	1251	1435	1656	1913	2085
GS										
Uncorrected	.14	.00	-.07	-.10	-.14	-.18	-.21	-.21	-.22	-.24
Univ. Corrected	-.17	-.21	-.25	-.23	-.26	-.29	-.30	-.28	-.26	
Mul. Corrected	-.11	-.20	-.23	-.24	-.26	-.29	-.30	-.27	-.26	
AR										
Uncorrected	-.11	-.12	-.18	-.21	-.24	-.27	-.29	-.28	-.29	-.31
Univ. Corrected	-.36	-.31	-.36	-.34	-.36	-.37	-.37	-.33	-.33	
Mul. Corrected	-.29	-.28	-.33	-.32	-.33	-.36	-.36	-.34	-.32	
WK										
Uncorrected	.04	-.07	-.12	-.16	-.20	-.24	-.27	-.27	-.28	-.28
Univ. Corrected	-.22	-.24	-.27	-.26	-.29	-.33	-.35	-.32	-.31	
Mul. Corrected	-.18	-.25	-.27	-.29	-.30	-.33	-.35	-.32	-.31	
PC										
Uncorrected	-.13	-.21	-.18	-.18	-.18	-.21	-.23	-.24	-.24	-.26
Univ. Corrected	-.32	-.35	-.30	-.27	-.27	-.29	-.30	-.29	-.27	
Mul. Corrected	-.25	-.34	-.31	-.30	-.27	-.29	-.30	-.28	-.27	
NO										
Uncorrected	-.22	-.20	-.21	-.23	-.24	-.22	-.21	-.22	.22	-.22
Univ. Corrected	-.33	-.25	-.28	-.28	-.29	-.26	-.25	-.25	-.24	
Mul. Corrected	-.27	-.23	-.25	-.26	-.26	-.24	-.23	-.23	-.23	
CS										
Uncorrected	-.27	-.25	-.25	-.26	-.27	-.25	-.25	-.25	-.24	-.25
Univ. Corrected	-.36	-.33	-.31	-.29	-.31	-.29	-.28	-.27	-.26	
Mul. Corrected	-.30	-.27	-.30	-.29	-.28	-.26	-.27	-.26	-.25	
AS										
Uncorrected	.01	.00	.03	.02	.00	-.05	-.08	-.10	-.12	-.16
Univ. Corrected	-.33	-.23	-.13	-.11	-.13	-.17	-.19	-.18	-.18	
Mul. Corrected	-.22	-.22	-.20	-.20	-.19	-.23	-.24	-.21	-.20	

Table A-4 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
MK										
Uncorrected	-.14	-.17	-.24	-.22	-.25	-.28	-.29	-.29	-.29	-.31
Univ. Corrected	-.45	-.41	-.43	-.37	-.38	-.39	-.37	-.36	-.33	
Mul. Corrected	-.38	-.35	-.38	-.34	-.35	-.35	-.36	-.34	-.32	
MC										
Uncorrected	-.09	-.09	-.14	-.12	-.13	-.18	-.19	-.20	-.20	-.24
Univ. Corrected	-.43	-.25	-.30	-.25	-.26	-.29	-.29	-.26	-.25	
Mul. Corrected	-.30	-.28	-.30	-.28	-.25	-.29	-.29	-.26	-.25	
EI										
Uncorrected	-.07	-.12	-.09	-.12	-.13	-.19	-.22	-.23	-.24	-.27
Univ. Corrected	-.34	-.30	-.24	-.24	-.26	-.29	-.30	-.29	-.28	
Mul. Corrected	-.25	-.28	-.25	-.27	-.25	-.30	-.32	-.30	-.29	
MK+AS										
Uncorrected	-.14	-.18	-.23	-.21	-.24	-.29	-.31	-.30	-.30	-.32
Univ. Corrected	-.46	-.42	-.43	-.36	-.38	-.40	-.40	-.37	-.34	
Mul. Corrected	-.40	-.38	-.39	-.36	-.36	-.39	-.39	-.37	-.34	

Table A-5

Uncorrected, Univariate Corrected and Multivariate Corrected Correlations for Engineman BE/E School (EN-6487)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
N =	128	259	393	534	630	775	898	1017	1124	1258
GS										
Uncorrected	-.11	-.09	-.11	-.15	.13	-.12	-.13	-.13	-.14	-.18
Univ. Corrected	-.14	-.11	-.17	-.21	-.21	-.18	-.18	-.18	-.18	
Mul. Corrected	-.32	-.19	-.22	-.25	-.23	-.19	-.19	-.18	-.19	
AR										
Uncorrected	-.25	-.13	-.15	-.15	-.17	-.17	-.17	-.18	-.18	-.22
Univ. Corrected	-.25	-.16	-.22	-.23	-.25	-.24	-.22	-.23	-.23	
Mul. Corrected	-.44	-.21	-.23	-.24	-.25	-.25	-.24	-.23	-.23	
WK										
Uncorrected	-.20	-.10	-.14	-.15	-.16	-.14	-.13	-.13	-.14	-.16
Univ. Corrected	-.22	-.13	-.19	-.22	-.23	-.20	-.18	-.18	-.17	
Mul. Corrected	-.33	-.16	-.21	-.24	-.23	-.20	-.17	-.17	-.18	
PC										
Uncorrected	-.19	-.13	-.15	-.17	-.18	-.17	-.16	-.15	-.17	-.19
Univ. Corrected	-.21	-.15	-.21	-.23	-.25	-.22	-.21	-.19	-.20	
Mul. Corrected	-.32	-.17	-.20	-.23	-.23	-.22	-.19	-.19	-.20	
NO										
Uncorrected	-.11	-.14	-.14	-.12	-.13	-.14	-.14	-.15	.15	-.16
Univ. Corrected	-.12	-.16	-.17	-.15	-.16	-.16	-.16	-.16	-.16	
Mul. Corrected	-.07	-.13	-.15	-.13	-.13	-.15	-.15	-.15	-.16	
CS										
Uncorrected	-.19	-.14	-.13	-.10	-.14	-.14	-.13	-.12	-.10	-.10
Univ. Corrected	-.21	-.16	-.16	-.12	-.15	-.15	-.14	-.12	-.10	
Mul. Corrected	-.13	-.12	-.12	-.11	-.14	-.15	-.14	-.13	-.12	
AS										
Uncorrected	-.19	-.11	-.11	-.12	-.15	-.16	-.19	-.22	-.23	-.26
Univ. Corrected	-.21	-.15	-.18	-.20	-.22	-.22	-.25	-.27	-.28	
Mul. Corrected	-.50	-.23	-.23	-.28	-.29	-.29	-.30	-.30	-.30	

Table A-5 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
MK										
Uncorrected	.08	.03	-.04	-.08	-.10	-.09	-.08	-.10	-.10	-.13
Univ. Corrected	-.04	-.06	-.15	-.20	-.22	-.19	-.17	-.17	-.16	
Mul. Corrected	-.04	-.04	-.11	-.16	-.17	-.15	-.14	-.15	-.15	
MC										
Uncorrected	-.09	-.20	-.16	-.17	-.18	-.18	-.18	-.20	-.22	-.25
Univ. Corrected	-.13	-.22	-.22	-.24	-.25	-.24	-.25	-.25	-.26	
Mul. Corrected	-.35	-.29	-.27	-.28	-.28	-.26	-.25	-.26	-.26	
EI										
Uncorrected	-.16	-.12	-.12	-.13	-.16	-.16	-.17	-.18	-.19	-.21
Univ. Corrected	-.18	-.15	-.17	-.19	-.22	-.21	-.22	-.22	-.23	
Mul. Corrected	-.39	-.21	-.22	-.25	-.26	-.24	-.24	-.23	-.23	
MK+AS										
Uncorrected	-.05	-.06	-.12	-.17	-.20	-.20	-.22	-.25	-.26	-.28
Univ. Corrected	-.11	-.12	-.21	-.27	-.30	-.28	-.28	-.30	-.30	
Mul. Corrected	-.40	-.20	-.25	-.32	-.33	-.32	-.31	-.33	-.32	

Table A-6

Uncorrected, Univariate Corrected, and Multivariate Corrected Correlations for Machinist's Mate BE/E School (MM-6492)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
N =	256	517	798	1067	1294	1510	1848	2106	2356	2598
GS										
Uncorrected	-.07	-.13	-.13	-.13	.15	.15	-.14	-.16	-.17	-.18
Univ. Corrected	-.26	-.25	-.22	-.22	-.22	-.22	-.19	-.20	-.21	
Mul. Corrected	-.21	-.25	-.19	-.20	-.21	-.20	-.18	-.19	-.19	
AR										
Uncorrected	-.13	-.14	-.13	-.15	-.18	-.20	-.19	-.20	-.20	-.23
Univ. Corrected	-.31	-.27	-.22	-.24	-.26	-.27	-.25	-.25	-.24	
Mul. Corrected	-.29	-.26	-.20	-.22	-.24	-.25	-.24	-.23	-.23	
WK										
Uncorrected	-.08	-.17	-.16	-.15	-.16	-.16	-.13	-.14	-.15	-.16
Univ. Corrected	-.24	-.28	-.24	-.22	-.22	-.22	-.19	-.18	-.18	
Mul. Corrected	-.22	-.27	-.21	-.21	-.21	-.21	-.17	-.17	-.18	
PC										
Uncorrected	-.09	-.14	-.15	-.14	-.14	-.16	-.15	-.15	-.14	-.15
Univ. Corrected	-.23	-.25	-.23	-.21	-.21	-.21	-.20	-.19	-.18	
Mul. Corrected	-.22	-.23	-.20	-.20	-.20	-.20	-.19	-.18	-.17	
NO										
Uncorrected	-.18	-.11	-.10	-.13	-.14	-.15	-.16	-.16	-.15	-.15
Univ. Corrected	-.31	-.18	-.16	-.18	-.18	-.19	-.19	-.18	-.17	
Mul. Corrected	-.19	-.12	-.10	-.13	-.14	-.15	-.17	-.16	-.16	
CS										
Uncorrected	-.25	-.15	-.15	-.13	-.13	-.13	-.15	-.17	-.17	-.19
Univ. Corrected	-.36	-.22	-.19	-.16	-.20	-.15	-.17	-.18	-.18	
Mul. Corrected	-.23	-.15	-.14	-.14	-.14	-.14	-.17	-.18	-.18	
AS										
Uncorrected	-.04	-.07	-.06	-.07	-.06	-.06	-.06	-.07	-.09	-.13
Univ. Corrected	-.17	-.19	-.15	-.15	-.14	-.14	-.13	-.12	-.13	
Mul. Corrected	-.32	-.26	-.19	-.21	-.19	-.18	-.15	-.14	-.15	

Table A-6 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
MK										
Uncorrected	-.13	-.11	-.10	-.12	-.15	-.16	-.18	-.18	-.20	-.22
Univ. Corrected	-.38	-.29	-.23	-.24	-.25	-.25	-.24	-.24	-.24	
Mul. Corrected	-.26	-.23	-.18	-.19	-.20	-.21	-.21	-.21	-.22	
MC										
Uncorrected	-.02	-.09	-.11	-.12	-.13	-.13	-.13	-.14	-.14	-.16
Univ. Corrected	-.22	-.22	-.20	-.21	-.21	-.20	-.19	-.19	-.19	
Mul. Corrected	-.20	-.23	-.19	-.20	-.20	-.20	-.19	-.18	-.23	
EI										
Uncorrected	-.19	.-17	-.18	-.14	-.13	-.12	-.12	-.14	-.15	-.17
Univ. Corrected	-.34	-.28	-.25	-.22	-.20	-.19	-.18	-.18	-.19	
Mul. Corrected	-.35	-.29	-.25	-.22	-.20	-.19	-.18	-.18	-.18	
MK+AS										
Uncorrected	-.18	-.18	-.16	-.19	-.20	-.20	-.21	-.21	-.23	-.25
Univ. Corrected	-.41	-.35	-.28	-.29	-.29	-.29	-.27	-.26	-.27	
Mul. Corrected	-.41	-.34	-.26	-.28	-.28	-.27	-.26	-.25	-.26	

Table A-7

Uncorrected, Univariate Corrected, and Multivariate Corrected Correlations for Aviation Machinist's Mate BE/E School (AD-6501)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
N =	87	172	261	348	435	528	607	710	783	880
GS										
Uncorrected	.01	-.02	-.02	-.05	-.06	-.11	-.14	-.16	-.15	-.17
Univ. Corrected	-.15	-.16	-.14	-.14	-.13	-.17	-.18	-.19	-.17	
Mul. Corrected	-.07	-.15	-.14	-.15	-.15	-.18	-.19	-.19	-.17	
AR										
Uncorrected	-.20	-.15	-.20	-.20	-.23	-.24	-.23	-.27	-.28	-.29
Univ. Corrected	-.29	-.27	-.30	-.28	-.29	-.29	-.27	-.30	-.30	
Mul. Corrected	-.39	-.34	-.34	-.30	-.31	-.30	-.28	-.31	-.30	
WK										
Uncorrected	-.04	-.02	-.03	-.02	-.05	-.12	-.14	-.17	-.16	-.18
Univ. Corrected	-.14	-.10	-.11	-.08	-.09	-.16	-.17	-.19	-.17	
Mul. Corrected	-.14	-.13	-.13	-.11	-.12	-.18	-.19	-.20	-.18	
PC										
Uncorrected	.00	-.07	-.05	-.09	-.10	-.14	-.13	-.16	-.17	-.18
Univ. Corrected	-.10	-.15	-.13	-.15	-.15	-.18	-.16	-.18	-.18	
Mul. Corrected	-.06	-.17	-.12	-.16	-.14	-.19	-.17	-.19	-.18	
NO										
Uncorrected	-.17	-.20	-.17	-.17	-.16	-.13	-.11	-.12	-.14	-.13
Univ. Corrected	-.17	-.20	-.18	-.18	-.17	-.14	-.12	-.13	-.14	
Mul. Corrected	-.19	-.22	-.19	-.18	-.16	-.13	-.11	-.13	-.13	
CS										
Uncorrected	-.28	-.20	-.20	-.21	-.19	-.21	-.17	-.16	-.15	-.15
Univ. Corrected	-.29	-.20	-.21	-.21	-.20	-.21	-.18	-.17	-.15	
Mul. Corrected	-.33	-.23	-.21	-.23	-.19	-.21	-.17	-.17	-.14	
AS										
Uncorrected	-.13	-.13	-.11	-.13	-.15	-.16	-.19	-.22	-.22	-.25
Univ. Corrected	-.17	-.15	-.14	-.15	-.17	-.19	-.21	-.24	-.23	
Mul. Corrected	-.19	-.27	-.26	-.24	-.24	-.25	-.26	-.26	-.25	

Table A-7 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Population Correlation
MK										
Uncorrected	.14	-.07	-.16	-.18	-.19	-.21	-.23	-.25	-.25	-.26
Univ. Corrected	-.24	-.20	-.27	-.27	-.26	-.27	-.27	-.27	-.27	
Mul. Corrected	-.08	-.25	-.28	-.27	-.26	-.26	-.26	-.28	-.27	
MC										
Uncorrected	-.13	-.15	-.17	-.15	-.18	-.17	-.19	-.23	-.24	-.25
Univ. Corrected	-.20	-.20	-.23	-.20	-.22	-.21	-.22	-.25	-.25	
Mul. Corrected	-.26	-.29	-.31	-.27	-.27	-.26	-.26	-.28	-.26	
EI										
Uncorrected	-.19	.-14	-.13	-.13	-.12	-.14	-.15	-.18	-.17	-.19
Univ. Corrected	-.27	-.22	-.21	-.20	-.18	-.19	-.19	-.20	-.19	
Mul. Corrected	-.26	-.26	-.27	-.24	-.21	-.22	-.21	-.22	-.20	
AR+MK+EI+GS										
Uncorrected	-.11	-.19	-.24	-.26	-.26	-.30	-.31	-.34	-.34	-.35
Univ. Corrected	-.23	-.31	-.34	-.34	-.33	-.35	-.35	-.37	-.36	
Mul. Corrected	-.30	-.38	-.39	-.37	-.35	-.37	-.36	-.38	-.36	

APPENDIX B

Z-ERROR TERMS FOR UNCORRECTED, UNIVARIATE CORRECTED, AND MULTIVARIATE CORRECTED CORRELATIONS

Table B-1

Z-Error Terms for Aviation
Electronics Technician BE/E School (AT-6230)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	-.14	-.16	-.19	-.16	-.15	-.14	-.10	-.07	-.05	-.14
Univ. Corrected	.78	.50	.37	.26	.20	.13	.11	.09	.04	.20
Mul. Corrected	.27	.20	.19	.12	.10	.05	.05	.05	.03	.10
AR										
Uncorrected	-.26	-.22	-.18	-.20	-.15	-.15	-.13	-.11	-.06	-.15
Univ. Corrected	.56	.34	.29	.17	.15	.09	.05	.02	.02	.15
Mul. Corrected	.41	.35	.27	.14	.14	.07	.04	.04	.04	.14
WK										
Uncorrected	-.12	-.11	-.15	-.15	-.12	-.11	-.10	-.09	-.05	-.11
Univ. Corrected	.62	.34	.15	.13	.11	.08	.05	.02	.02	.11
Mul. Corrected	.25	.22	.17	.10	.10	.06	.05	.04	.03	.10
PC										
Uncorrected	-.10	-.14	-.15	-.17	-.12	-.11	-.08	-.06	-.03	-.12
Univ. Corrected	.30	.19	.07	.08	.07	.08	.03	.02	.02	.07
Mul. Corrected	.15	.13	.11	.03	.04	.02	.02	.03	.02	.03
NO										
Uncorrected	-.05	-.14	-.09	-.08	-.07	-.06	-.04	-.03	.02	-.07
Univ. Corrected	.30	.19	.12	.03	.00	-.01	.00	.00	-.01	-.01
Mul. Corrected	.05	-.04	-.03	-.03	-.03	-.02	-.01	.00	.00	-.03
CS										
Uncorrected	.09	-.09	-.07	-.05	-.05	-.05	-.02	-.04	-.04	-.05
Univ. Corrected	.31	.26	.13	.05	.02	.00	.00	-.01	-.01	.02
Mul. Corrected	.01	-.02	-.02	.00	.00	.01	.02	.01	.00	.01
AS										
Uncorrected	-.17	-.14	-.11	-.07	-.07	-.09	-.06	-.06	-.04	-.07
Univ. Corrected	.20	.11	.03	.06	.06	.03	.03	.00	.01	.03
Mul. Corrected	.08	.11	.11	.11	.09	.05	.05	.05	.04	.08

Table B-1 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
MK										
Uncorrected	-.14	-.24	-.20	-.18	-.12	-.12	-.10	-.06	-.03	-.12
Univ. Corrected	.82	.36	.32	.20	.18	.11	.08	.07	.05	.18
Mul. Corrected	.56	.28	.20	.11	.12	.08	.05	.05	.05	.11
MC										
Uncorrected	-.16	-.12	-.09	-.10	-.06	-.10	-.06	-.05	-.04	-.09
Univ. Corrected	.44	.17	.17	.12	.12	.07	.06	.05	.02	.12
Mul. Corrected	.18	.19	.18	.12	.12	.06	.06	.05	.02	.12
EI										
Uncorrected	-.12	-.09	-.12	-.11	-.11	-.11	-.08	-.07	-.05	-.11
Univ. Corrected	.84	.51	.35	.23	.16	.10	.09	.05	.03	.16
Mul. Corrected	.19	.19	.17	.12	.11	.08	.06	.05	.04	.11
AR+MK+EI+GS										
Uncorrected	-.15	-.18	-.14	-.14	-.10	-.11	-.09	-.05	-.03	-.11
Univ. Corrected	.92	.47	.40	.24	.23	.13	.10	.08	.07	.23
Mul. Corrected	.78	.50	.38	.23	.21	.13	.10	.08	.07	.21

Table B-2

Z-Error Terms For Aviation
Electronics Technician "A" School (AT-6239)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	-.04	-.01	-.05	-.11	-.10	-.08	-.06	-.03	-.02	-.05
Univ. Corrected	.69	.43	.20	.08	.05	.04	.03	.04	.03	.05
Mul. Corrected	.32	.27	.14	.04	.02	.02	.02	.04	.03	.04
AR										
Uncorrected	-.11	-.10	-.07	-.06	-.10	-.10	-.07	-.05	-.02	-.07
Univ. Corrected	.58	.27	.13	.06	.00	-.01	.00	.01	.01	.01
Mul. Corrected	.34	.27	.18	.11	.02	.01	.01	.03	.02	.03
WK										
Uncorrected	-.03	-.05	-.10	-.10	-.09	-.07	-.06	-.04	-.03	-.06
Univ. Corrected	.51	.26	.05	.01	-.01	.01	.00	.01	.00	.01
Mul. Corrected	.29	.19	.08	.02	.01	.02	.01	.02	.01	.02
PC										
Uncorrected	-.11	-.08	-.05	-.09	-.08	-.06	-.07	-.05	-.03	-.07
Univ. Corrected	.22	.15	.06	.00	.00	.00	-.02	-.01	.00	-.01
Mul. Corrected	.12	.12	.08	.01	.00	.00	-.02	.01	.00	.01
NO										
Uncorrected	-.03	-.08	-.05	-.04	-.03	-.02	-.01	.00	.00	-.03
Univ. Corrected	.27	.09	.02	-.01	-.01	-.01	.00	.01	.01	-.01
Mul. Corrected	.05	-.03	-.02	-.02	-.02	-.01	.00	.01	.01	-.02
CS										
Uncorrected	-.05	-.08	-.04	-.04	-.03	-.02	-.01	-.01	-.01	-.03
Univ. Corrected	.30	.11	.02	-.01	-.01	-.01	.01	00	.00	-.01
Mul. Corrected	.05	-.02	-.01	-.01	.00	.02	.03	.02	.00	.02
AS										
Uncorrected	-.10	-.11	-.05	-.05	-.04	-.02	-.04	-.03	-.02	-.04
Univ. Corrected	.18	.02	.01	.00	.01	.02	.00	.00	.00	.01
Mul. Corrected	.08	.10	.12	.06	.04	.05	.02	.04	.02	.05

Table B-2 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
MK										
Uncorrected	-.03	-.05	-.12	-.09	-.07	-.05	-.07	-.04	-.02	-.05
Univ. Corrected	.69	.35	.11	.06	.04	.04	.00	.02	.02	.04
Mul. Corrected	.52	.30	.09	.06	.05	.05	.01	.03	.02	.05
MC										
Uncorrected	-.04	-.02	.01	.01	-.01	-.01	-.04	-.02	-.02	-.02
Univ. Corrected	.40	.19	.15	.11	.07	.06	.01	.02	.01	.07
Mul. Corrected	.24	.24	.20	.15	.10	.07	.03	.04	.02	.10
EI										
Uncorrected	-.05	-.10	-.09	-.07	-.05	-.04	-.03	-.03	-.02	-.05
Univ. Corrected	.65	.29	.13	.06	.05	.04	.03	.03	.01	.05
Mul. Corrected	.23	.14	.08	.06	.05	.04	.04	.04	.02	.05
AR+MK+EI+GS										
Uncorrected	.00	-.04	-.09	-.10	-.09	-.08	-.07	-.04	-.02	-.07
Univ. Corrected	.73	.38	.14	.06	.03	.03	.00	.03	.02	.03
Mul. Corrected	.59	.39	.18	.10	.05	.05	.03	.05	.04	.05

Table B-3

Z-Error Terms For Electronics
Technician BE/E School (ET-6403)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	.00	-.07	-.03	-.04	-.07	-.06	-.03	-.03	.00	-.03
Univ. Corrected	.50	.22	.22	.15	.09	.06	.06	.04	.03	.09
Mul. Corrected	.27	.07	.09	.05	.03	.01	.02	.01	.01	.03
AR										
Uncorrected	-.09	-.11	-.19	-.16	-.09	-.09	-.05	-.04	-.03	-.09
Univ. Corrected	.39	.09	-.03	-.02	.03	.00	.02	.02	.01	.02
Mul. Corrected	.25	.15	.00	-.02	.04	.01	.02	.02	.01	.02
WK										
Uncorrected	.01	-.06	.00	.00	-.01	-.02	-.01	-.02	-.02	-.01
Univ. Corrected	.23	.11	.15	.12	.10	.06	.05	.02	.00	.10
Mul. Corrected	-.04	.03	.06	.04	.02	.01	.01	-.01	-.02	.02
PC										
Uncorrected	-.01	.00	-.08	-.09	-.05	-.02	-.02	-.02	-.01	-.02
Univ. Corrected	.19	.06	.00	-.01	.02	.04	.02	.01	.00	.02
Mul. Corrected	.18	.12	.03	-.03	.02	.03	.02	.02	.01	.03
NO										
Uncorrected	-.03	-.00	-.04	-.04	.00	-.02	-.02	-.01	.00	-.04
Univ. Corrected	.21	-.02	-.04	-.03	.01	-.01	-.01	.00	.00	-.01
Mul. Corrected	-.06	.04	-.04	-.03	.00	-.02	-.02	-.02	-.01	-.02
CS										
Uncorrected	.02	.03	.00	.02	.04	.03	.03	.01	.00	.02
Univ. Corrected	.29	.10	.02	.06	.08	.07	.06	02	.01	.06
Mul. Corrected	.00	.08	.00	.01	.03	.02	.02	.01	.00	.01
AS										
Uncorrected	-.01	-.09	.02	-.04	-.05	-.02	-.03	-.01	-.01	-.02
Univ. Corrected	.29	.08	.18	.06	.02	.02	.00	.02	.01	.02
Mul. Corrected	.08	-.05	.08	-.01	.00	.02	.02	.02	.01	.02

Table B-3 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
MK										
Uncorrected	-.10	-.19	-.17	-.14	-.09	-.12	-.09	-.05	-.02	-.10
Univ. Corrected	.43	.06	.03	.01	.05	-.02	.00	.00	.00	-.02
Mul. Corrected	.19	.04	.01	.00	.02	-.03	-.02	.00	.00	.02
MC										
Uncorrected	-.16	-.07	.01	-.05	-.05	-.02	-.04	-.04	-.01	-.04
Univ. Corrected	.19	.08	.17	.07	.04	.04	.01	.00	.01	.04
Mul. Corrected	.04	-.16	.10	.01	.02	.04	.02	.01	.01	.02
EI										
Uncorrected	-.10	-.18	.00	-.04	-.05	-.02	-.01	-.01	.00	-.02
Univ. Corrected	.45	.19	.23	.12	.08	.06	.06	.04	.03	.08
Mul. Corrected	.10	-.01	.11	.03	.03	.04	.05	.03	.02	.03
AR+MK+EI+GS										
Uncorrected	-.03	-.14	-.08	-.10	-.07	-.08	-.04	-.03	.00	-.07
Univ. Corrected	.53	.14	.16	.07	.08	.02	.04	.03	.03	.07
Mul. Corrected	.43	.12	.10	.04	.06	.02	.03	.03	.03	.04

Table B-4

Z-Error Terms For Boiler
Technician "A" School (BT-6486)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	-.10	-.24	-.17	-.14	-.10	-.06	-.03	-.03	.02	-.10
Univ. Corrected	-.07	-.03	.01	-.01	.02	.05	.07	.05	.03	.03
Mul. Corrected	-.13	-.04	-.01	.00	.03	.06	.07	.04	.03	.04
AR										
Uncorrected	-.21	-.20	-.14	-.11	-.08	-.04	-.02	-.03	-.02	-.08
Univ. Corrected	.06	.00	.06	.03	.06	.07	.07	.02	.02	.06
Mul. Corrected	-.02	-.03	.02	.01	.02	.06	.06	.03	.01	.02
WK										
Uncorrected	-.25	-.22	-.17	-.13	-.09	-.05	-.01	-.01	.00	-.09
Univ. Corrected	-.06	-.04	-.01	-.02	.01	.05	.08	.04	.03	.04
Mul. Corrected	-.11	-.03	-.01	.01	.02	.05	.08	.04	.03	.03
PC										
Uncorrected	-.14	-.06	-.09	-.09	-.09	-.06	-.04	-.03	-.03	-.06
Univ. Corrected	.07	.10	.04	.01	.01	.03	.04	.03	.01	.03
Mul. Corrected	-.01	.08	.05	.04	.01	.03	.04	.02	.01	.03
NO										
Uncorrected	.00	-.02	-.01	.01	.02	.00	-.01	.00	.00	-.01
Univ. Corrected	.12	.03	.06	.06	.07	.04	.03	.03	.02	.04
Mul. Corrected	.06	.01	.04	.05	.05	.02	.01	.01	.01	.02
CS										
Uncorrected	.02	.00	.00	.01	.02	.00	.00	.00	-.02	.00
Univ. Corrected	.12	.09	.07	.04	.07	.04	.03	02	.01	.04
Mul. Corrected	.05	.02	.05	.04	.03	.01	.02	.01	.00	.02
AS										
Uncorrected	-.15	-.16	-.13	-.14	-.16	-.11	-.08	-.06	-.04	-.13
Univ. Corrected	.18	.07	-.03	-.05	-.03	.01	.03	.02	.02	-.03
Mul. Corrected	.06	.06	.04	.04	.03	.07	.08	.05	.04	.05

Table B-4 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
MK										
Uncorrected	-.18	-.15	-.08	-.10	-.06	-.03	-.02	-.02	-.02	-.06
Univ. Corrected	.16	.11	.14	.07	.08	.09	.07	.06	.02	.08
Mul. Corrected	.08	.05	.08	.03	.05	.05	.06	.03	.01	.05
MC										
Uncorrected	-.15	-.15	-.10	-.12	-.11	-.06	-.05	-.04	-.04	-.11
Univ. Corrected	.21	.01	.07	.01	.02	.05	.05	.02	.02	.02
Mul. Corrected	.07	.05	.07	.05	.02	.06	.06	.03	.02	.05
EI										
Uncorrected	-.21	-.16	-.19	-.16	-.15	-.09	-.06	-.05	-.04	-.15
Univ. Corrected	.08	.03	-.03	-.03	-.01	.02	.03	.02	.01	.03
Mul. Corrected	-.02	.01	-.02	.00	-.02	.03	.05	.03	.02	-.02
MK+AS										
Uncorrected	-.19	-.15	-.10	-.12	-.09	-.03	-.01	-.02	-.02	-.09
Univ. Corrected	.17	.12	.13	.05	.07	.09	.09	.06	.02	.09
Mul. Corrected	.09	.07	.08	.05	.05	.08	.08	.06	.02	.07

Table B-5

Z-Error Terms For
Engineman BE/E School (EN-6487)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	-.07	-.09	-.07	-.03	-.05	-.06	-.05	-.05	-.04	-.05
Univ. Corrected	-.04	-.07	-.01	.03	.03	.00	.00	.00	.00	-.01
Mul. Corrected	.15	.01	.04	.08	.05	.01	.01	.00	.01	.01
AR										
Uncorrected	.04	-.09	-.07	-.07	-.05	-.05	-.05	-.04	-.04	-.05
Univ. Corrected	.03	-.06	.00	.01	.03	.02	.00	.01	.01	.01
Mul. Corrected	.25	-.01	.01	.02	.04	.04	.02	.01	.01	.02
WK										
Uncorrected	.04	-.06	-.02	-.01	.00	-.02	-.03	-.03	-.02	-.02
Univ. Corrected	.06	-.03	.03	.06	.07	.04	.02	.02	.01	.03
Mul. Corrected	.18	.00	.05	.08	.07	.04	.01	.01	.02	.04
PC										
Uncorrected	.00	-.06	-.04	-.02	-.01	-.02	-.03	-.04	-.02	-.02
Univ. Corrected	.02	-.04	.02	.04	.06	.03	.02	.00	.01	.02
Mul. Corrected	.14	-.02	.01	.04	.04	.03	.00	.00	.01	-.02
NO										
Uncorrected	-.05	-.02	-.02	-.04	-.03	-.02	-.02	-.01	-.01	-.02
Univ. Corrected	-.04	.00	.01	-.01	.00	.00	.00	.00	.00	.00
Mul. Corrected	-.09	-.03	-.01	-.03	-.03	-.01	-.01	-.01	.00	-.01
CS										
Uncorrected	.09	.04	.03	.00	.04	.04	.03	.02	.00	.03
Univ. Corrected	.11	.06	.06	.02	.05	.05	.04	02	.00	.05
Mul. Corrected	.03	.02	.02	.01	.04	.05	.04	.03	.02	.03
AS										
Uncorrected	-.08	-.16	-.16	-.15	-.12	-.11	-.08	-.05	-.04	-.11
Univ. Corrected	-.05	-.11	-.09	-.06	-.04	-.04	-.01	.01	.02	-.04
Mul. Corrected	.28	-.04	-.04	.02	.03	.03	.04	.04	.04	.04

Table B-5 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
MK										
Uncorrected	.05	.10	-.09	-.05	-.03	-.04	-.05	-.03	-.03	-.05
Univ. Corrected	-.09	-.07	.02	.07	.09	.06	.04	.04	.03	.06
Mul. Corrected	-.09	-.09	-.02	.03	.04	.02	.01	.02	.02	.02
MC										
Uncorrected	-.17	-.06	-.10	-.09	-.08	-.08	-.07	-.06	-.04	-.08
Univ. Corrected	-.12	-.03	-.03	-.01	.00	-.01	.00	.00	.01	-.01
Mul. Corrected	.11	.04	.02	.03	.03	.01	.00	.01	.01	.02
EI										
Uncorrected	-.05	-.09	-.09	-.08	-.05	-.05	-.04	-.03	-.02	-.05
Univ. Corrected	-.03	-.06	-.04	-.02	.01	.00	.01	.01	.02	.02
Mul. Corrected	.20	.00	.01	.05	.06	.03	.03	.02	.02	.03
MK+AS										
Uncorrected	-.24	-.23	-.17	-.12	-.09	-.09	-.07	-.03	-.02	-.09
Univ. Corrected	-.18	-.17	-.08	-.01	.02	.00	.00	.02	.02	.02
Mul. Corrected	.13	-.09	-.03	.04	.05	.04	.03	.05	.04	.04

Table B-6

Z-Error Terms For Machinist's Mate BE/E School (MM-6492)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	-.11	-.05	-.05	-.05	-.03	-.03	-.04	-.02	-.01	-.04
Univ. Corrected	.08	.07	.04	.04	.04	.04	.01	.02	.03	.04
Mul. Corrected	.03	.08	.01	.02	.03	.02	.00	.01	.01	.02
AR										
Uncorrected	-.10	-.09	-.10	-.08	-.05	-.03	-.04	-.03	-.03	-.05
Univ. Corrected	.09	.04	-.01	.01	.03	.04	.02	.02	.01	.02
Mul. Corrected	.07	.04	-.03	-.01	.01	.03	.01	.00	.00	.01
WK										
Uncorrected	-.08	.01	.00	-.01	.00	.00	-.03	-.02	-.01	-.01
Univ. Corrected	.08	.13	.08	.06	.06	.06	.03	.02	.02	.06
Mul. Corrected	.06	.12	.05	.05	.05	.05	.01	.01	.02	.05
PC										
Uncorrected	-.06	-.01	.00	-.01	-.01	.01	.00	.00	-.01	-.01
Univ. Corrected	.08	.10	.08	.06	.06	.06	.05	.04	.03	.06
Mul. Corrected	.07	.08	.05	.05	.05	.05	.04	.03	.02	.05
NO										
Uncorrected	.03	-.04	-.05	-.02	-.01	.00	.01	.01	.00	.01
Univ. Corrected	.17	.03	.01	.03	.03	.04	.04	.03	.02	.03
Mul. Corrected	.04	-.03	-.05	-.02	-.01	.00	.02	.01	.01	.02
CS										
Uncorrected	.07	-.04	-.04	-.06	-.06	-.06	-.04	-.02	-.02	-.04
Univ. Corrected	.19	.03	.00	-.03	.01	-.04	-.02	-.01	-.01	-.02
Mul. Corrected	.04	-.04	-.05	-.05	-.05	-.05	-.02	-.01	-.01	-.04
AS										
Uncorrected	-.09	-.06	-.07	-.06	-.07	-.07	-.07	-.06	-.04	-.07
Univ. Corrected	.04	.06	.02	.02	.01	.01	.00	-.01	.00	.01
Mul. Corrected	.20	.14	.06	.08	.06	.05	.02	.01	.02	.06

Table B-6 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
MK										
Uncorrected	-.09	-.11	-.12	-.10	-.07	-.06	-.04	-.04	-.02	-.07
Univ. Corrected	.18	.07	.01	.02	.03	.03	.02	.02	.02	.02
Mul. Corrected	.05	.01	-.04	-.03	-.02	-.01	-.01	-.01	.00	-.01
MC										
Uncorrected	-.14	-.07	-.05	-.04	-.03	-.03	-.03	-.02	-.02	-.03
Univ. Corrected	.06	.06	.04	.05	.05	.04	.03	.03	.03	.04
Mul. Corrected	.04	.07	.03	.04	.04	.04	.03	.02	.07	.04
EI										
Uncorrected	.02	.00	.01	.03	-.04	-.05	-.05	-.03	-.02	.03
Univ. Corrected	.18	.12	.08	.05	.03	.02	.01	.01	.02	.03
Mul. Corrected	.20	.13	.09	.05	.03	.02	.01	.01	.01	.03
MK+AS										
Uncorrected	-.08	-.08	-.10	-.07	-.06	-.06	-.05	-.05	-.03	-.06
Univ. Corrected	.18	.11	.03	.04	.04	.04	.02	.01	.02	.03
Mul. Corrected	.18	.09	.01	.03	.03	.02	.01	.00	.01	.02

Table B-7

Z-Error Terms For Aviation
Machinist's Mate BE/E School (AD-6501)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
GS										
Uncorrected	-.18	-.15	-.15	-.12	-.11	-.06	-.03	-.01	-.02	-.11
Univ. Corrected	-.02	-.01	-.03	-.03	-.04	.00	.01	.02	.00	.02
Mul. Corrected	-.10	-.02	-.03	-.02	-.02	.01	.02	.02	.00	.02
AR										
Uncorrected	-.10	-.15	-.10	-.10	-.07	-.06	-.07	-.02	-.01	-.07
Univ. Corrected	.00	-.02	.01	-.01	.00	.00	-.02	.01	.01	.01
Mul. Corrected	.11	.05	.05	.01	.02	.01	-.01	.02	.01	.02
WK										
Uncorrected	-.14	-.16	-.15	-.16	-.13	-.06	-.04	-.01	-.02	-.13
Univ. Corrected	-.04	-.08	-.07	-.10	-.09	-.02	-.01	.01	-.01	-.04
Mul. Corrected	-.04	-.05	-.05	-.07	-.06	.00	.01	.02	.00	-.04
PC										
Uncorrected	-.18	-.11	.13	-.09	-.08	-.04	-.05	-.02	-.01	-.08
Univ. Corrected	-.08	-.03	-.05	-.03	-.03	.00	-.02	.00	.00	-.03
Mul. Corrected	-.12	-.01	-.06	-.02	-.04	.01	-.01	.01	.00	.01
NO										
Uncorrected	.04	.07	.04	.04	.03	.00	-.02	-.01	.01	.03
Univ. Corrected	.04	.07	.05	.05	.04	.01	-.01	.00	.01	.04
Mul. Corrected	.06	.09	.06	.05	.03	.00	-.02	.00	.00	.03
CS										
Uncorrected	.14	.05	.05	.06	.04	.06	.02	.01	.00	.05
Univ. Corrected	.15	.05	.06	.06	.05	.06	.03	02	.00	.05
Mul. Corrected	.19	.08	.06	.08	.04	.06	.02	.02	-.01	.06
AS										
Uncorrected	-.13	-.13	-.15	-.13	-.11	-.10	-.07	-.04	-.04	-.11
Univ. Corrected	-.08	-.10	-.11	-.10	-.08	-.06	-.05	-.02	-.03	-.08
Mul. Corrected	-.07	.02	.01	-.02	-.02	.00	.01	.01	.00	.01

Table B-7 (Continued)

Selector	Selection Ratio .10	.20	.30	.40	.50	.60	.70	.80	.90	Overall Median
MK										
Uncorrected	-.13	-.20	-.11	-.09	-.08	-.06	-.04	-.01	-.01	-.08
Univ. Corrected	-.02	-.06	.01	.01	.00	.01	.01	.01	.01	.01
Mul. Corrected	-.19	-.01	.02	.01	.00	.00	.00	.02	.01	-.01
MC										
Uncorrected	-.13	-.11	-.09	-.11	-.08	-.09	-.07	-.03	-.02	-.09
Univ. Corrected	-.05	-.05	-.02	-.05	-.03	-.04	-.04	.00	.00	-.04
Mul. Corrected	.01	.04	.06	.02	.02	.01	.01	.03	.01	.02
EI										
Uncorrected	.00	-.15	-.06	-.06	-.07	-.05	-.04	-.01	-.02	-.05
Univ. Corrected	.09	.03	.02	.01	-.01	.00	.00	.01	.00	.01
Mul. Corrected	.08	.08	.09	.05	.02	.03	.02	.03	.01	.03
AR+MK+EI+GS										
Uncorrected	-.26	-.18	-.13	-.10	-.10	-.06	-.05	-.02	-.02	-.10
Univ. Corrected	-.13	-.04	-.01	-.01	-.02	.00	.00	.02	.01	-.01
Mul. Corrected	-.06	.03	.04	.02	.00	.02	.01	.03	.01	.02

DISTRIBUTION LIST

Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics)
Deputy Under Secretary of Defense for Research and Engineering (Research and Advanced Technology)
Deputy Assistant Secretary of the Navy (Manpower and Reserve Affairs)
Chief of Naval Operations (OP-01), (OP-01B7) (2), (OP-13)
Chief of Naval Material (NMAT 0722)
Commander, Naval Military Personnel Command (NMPC-4), (NMPC-46), (NMPC-48)
Chief of Naval Technical Training (Code N-6)
Commanding Officer, Naval Training Equipment Center (Code 1)
Commander, Army Research Institute for the Behavioral and Social Sciences, Alexandria (PERI-ASL), (PERI-ZT), (PERI-SZ)
Headquarters, USMEPCOM/MEPCPAT-A, North Chicago, IL
Commander, Air Force Human Resources Laboratory, Brooks Air Force Base (Manpower and Personnel Division) (2), (TSRL/Technical Library)
Commander, Air Force Human Resources Laboratory, Williams Air Force Base (AFHRL/OT)
Commander, Air Force Human Resources Laboratory, Wright-Patterson Air Force Base (AFHRL/LR-TDC)
Commanding Officer, U.S. Coast Guard Research and Development Center, Avery Point
Superintendent, Naval Postgraduate School
Director of Research, U.S. Naval Academy
Defense Technical Information Center (DDA) 912)

DEPARTMENT OF THE NAVY

NAVY PERSONNEL RESEARCH AND
DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92152

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE NAVY
DoD-316